SIBOGA-EXPEDITIE.

Siboga-Expeditie

UITKOMSTEN

OP

ZOOLOGISCH, BOTANISCH, OCEANOGRAPHISCH EN GEOLOGISCH GEBIED

VERZAMELD IN

NEDERLANDSCH OOST-INDIË 1899—1900

AAN BOORD **H. M. SIBOGA** ONDER COMMANDO VAN

Luitenant ter zee 1e kl. G. F. TYDEMAN

UITGEGEVEN DOOR

Dr. MAX WEBER
Prof. in Amsterdam, Leider der Expeditie

(met medewerking van de Maatschappij ter bevordering van het Natuurkundig Onderzoek der Nederlandsche Koloniën)

BOEKHANDEL EN DRUKKERIJ
VOORHEEN
E. J. BRILL
LEIDEN

APR 1954
LIBRARY
POFI
FISH & WILDLIFE
SERVICE

Siboga-Expeditie
XIII b¹

THE

GORGONACEA OF THE SIBOGA EXPEDITION

IV. THE PLEXAURIDÆ

BY

C. C. NUTTING
Professor of Zoology, State University of Iowa

With 4 plates

(Aided by a grant from the ELIZABETH THOMPSON SCIENCE FUND)

LATE E. J. BRILL
PUBLISHERS AND PRINTERS
LEYDEN — 1910

Q115
S1
No. 13 f'-f⁵
1274

THE GORGONACEA OF THE SIBOGA EXPEDITION

IV. THE PLEXAURIDÆ

BY

C. C. NUTTING,
Professor of Zoology, State University of Iowa.

With 4 plates.

(Aided by a grant from the ELIZABETH THOMPSON SCIENCE FUND.)

Family PLEXAURIDÆ Gray.

Plexaura Lamouroux. Exposition Méthodique, 1821, p. 35.
Plexauridæ Gray. Annals and Magazine of Natural History, Series 3, Vol. IV, 1859.
Eunicea + *Plexaura* Milne Edwards et Haime. Histoire naturelle des Coralliaires, 1857, Vol. I, pp. 146, 152.
Euniceidæ Kölliker. Icones Histologicæ, II, 1865, p. 137.
Plexauridæ Verrill. Transactions Connecticut Academy of Science, Vol. I, 1869, p. 135.
Euniceidæ Ridley. Annals and Magazine of Natural History, Series 5, Vol. 11, 1883, p. 253.
Plexauridæ Wright and Studer. Challenger Reports, the Alcyonaria, 1889, p. 135.
Plexauridæ Studer. Alcyonarien aus der Sammlung des Naturhistorischen Museums in Lübeck, 1894, p. 111.
Plexauridæ Brundin. Bihang til Svenska Vet.-Akad. Handlingar, Band 22, Afd., 17, N^0 3, 1896, p. 17.
Plexauridæ Thomson and Henderson. Ceylon Pearl Oyster Report, Alcyonaria, 1905, p. 304.

The original definition of the family, as given by GRAY, is as follows:

"Bark granular, persistent, cork-like, without any important grooves. Cells placed equally on all sides of the branches".

VERRILL, as usual, was quick to discern the most important characters by which this family can be differentiated from its allies. His definition is as follows:

"Corallum usually dichotomous or more or less arborescent. Axis horn-like, or more or less calcareous, especially at base. Longitudinal ducts equal, arranged regularly all around the axis. Cœnenchyma usually thick. Cells scattered over all parts of the surface, flat, or elevated on prominent verrucæ. Tentacles at base, and sides of the polyps stiffened with large fusiform spicula. Spicula of the cœnenchyma usually large, of various forms, most usually these are large warty spindles mingled with clubs or crosses".

For the purposes of this work the following definition is offered:

Cœnenchyma thick, without evident grooves; axis cylinder horny, or horny and calcareous, but never jointed. Primary water-vascular canals in a regular series around the axis. Calyces on all sides of the stem and branches, often entirely included. Spicules various, usually spindles, clubs, butterfly-shaped or Blattkeulen.

As WRIGHT and STUDER remark: "The genera belonging to the family as it now stands, certainly require revision".

The material secured by the Siboga Expedition that can be referred to the Plexauridæ is not sufficient in extent to justify the author of this report in undertaking a revision of the family, and he therefore contents himself with recognizing the genera defined in the Challenger Report, and the addition of a single new genus which seems necessary to accommodate a remarkable species collected by the Siboga Expedition.

The most important feature in the diagnosis of genera in this family seems to be the character of the axis cylinder, the forms of the calyces and spicules being however, of great service in generic description in some cases.

The following artificial key may be of service in aiding the student to determine the generic affinities of species.

Artificial key to the genera of PLEXAURIDÆ.

Stem, branches and horny axis distinctly flattened . . . . . (**Platygorgia**)[1]
Calyces prominent and bilabiate . . . . . (**Eunicea**)
Calyces moderately prominent, not bilabiate.
  Spicules armed with long, truncate verrucæ . . . . . (**Anthoplexaura**)
  Spicules small, the outer layer club-shaped. . . . . (**Paraplexaura**)
Calyces neither bilabiate nor decidedly prominent. Axis not distinctly flattened.
  Axis entirely horny, except at base, or with calcareous particles deposited in the central core.
    Spicules usually spindles, horizontally or longitudinally placed in outer layer of cœnenchyma.
      Cœnenchyma thick. No very large, bar-like spicules . . . . . **Plexaura**

[1] Generic names enclosed in brackets indicate that such genera are not represented in the Siboga collection.

Cœnenchyma thin. Large, bar-like spicules very prominent. . . . **Hicksonella**
Spicules of outer layer clubs or "Blattkeulen" vertically placed.
Clubs large. Terminal branches long and slender . . . . . **Plexauroides**
Clubs small. Terminal branches short . . . . . (**Paraplexaura**)
Clubs minute, their club-ends inflated and free . . . . . (**Eunicella**)
Axis with a central horny core, around which is a tubular casing containing more or less calcareous matter.
Spicules large, clubs, crosses and triradiate forms predominating. . . (**Plexaurella**)
Spicules small, short oval spindles and double spindles predominating. **Euplexaura**

The writer is unable to find any character in the definition of the genus *Psammogorgia* Verrill by which it can be differentiated from others of the family. He therefore gives the definition proposed by the original describer, which is as follows:

"*Psammogorgia* Verrill. Corallum dichotomous or subpinnate, with ronnd branches. Axis horn-like. Cœnenchyma moderately thick, the surface finely granulated with small rough spicula. Cells scattered, sometimes flat, more frequently raised in the form of rounded verrucæ. Polyps with rather large, elongated, slender warty spindles at the bases of the tentacles. Spicula of the cœnenchyma mostly short, thick, and very rough, warty spindles and rough, warty clubs of moderate size".

(VERRILL, Transactions Connecticut Academy of Science, Vol. 1, Part 2, p. 414).

Synoptic view of the genera and species of the Siboga collection of PLEXAURIDÆ.

*The asterisk (*) denotes a new genus or species.

Plexaura.

**P. aggregata*, **P. attenuata*, **P. recta*, **P. platystoma*, **P. pinnata*, **P. flava*.

Plexauroides.

P. praelonga, *P. lenzii*.

Euplexaura.

**E. rubra*, **E. mollis*, **E. reticulata*.

***Hicksonella.**

**H. princeps*.

Psammogorgia.

P. arbuscula.

The above table indicates that of the thirteen species of the Plexauridæ collected, ten appear to be new, and nearly half of the total number belong to the type genus, *Plexaura*. This genus has heretofore been unrepresented in the East Indian Region, with the exception of one species which THOMSON and HENDERSON identify as a variety, (*flexuosa*) of *P. antipathes*. The present writer is of the opinion that this form is identical with the new species *P. aggregata*, described beyond.

Systematic discussion of genera and species.

Plexaura Lamouroux (emended).

Plexaura Lamouroux. Histoire des Polypiers coralligènes flexibles, 1816, p. 424.
Plexaura Lamouroux. Exposition Méthodique, 1821, p. 35.
Plexaura Milne Edwards et Haime. Histoire Naturelle des Coralliaires, Vol. 1, 1857, p. 152.

VERRILL, as usual, was quick to discern the most important characters by which this family can be differentiated from its allies. His definition is as follows:

"Corallum usually dichotomous or more or less arborescent. Axis horn-like, or more or less calcareous, especially at base. Longitudinal ducts equal, arranged regularly all around the axis. Cœnenchyma usually thick. Cells scattered over all parts of the surface, flat, or elevated on prominent verrucæ. Tentacles at base, and sides of the polyps stiffened with large fusiform spicula. Spicula of the cœnenchyma usually large, of various forms, most usually these are large warty spindles mingled with clubs or crosses".

For the purposes of this work the following definition is offered:

Cœnenchyma thick, without evident grooves; axis cylinder horny, or horny and calcareous, but never jointed. Primary water-vascular canals in a regular series around the axis. Calyces on all sides of the stem and branches, often entirely included. Spicules various, usually spindles, clubs, butterfly-shaped or Blattkeulen.

As WRIGHT and STUDER remark: "The genera belonging to the family as it now stands, certainly require revision".

The material secured by the Siboga Expedition that can be referred to the Plexauridæ is not sufficient in extent to justify the author of this report in undertaking a revision of the family, and he therefore contents himself with recognizing the genera defined in the Challenger Report, and the addition of a single new genus which seems necessary to accommodate a remarkable species collected by the Siboga Expedition.

The most important feature in the diagnosis of genera in this family seems to be the character of the axis cylinder, the forms of the calyces and spicules being however, of great service in generic description in some cases.

The following artificial key may be of service in aiding the student to determine the generic affinities of species.

Artificial key to the genera of PLEXAURIDÆ.

Stem, branches and horny axis distinctly flattened . . . . . (**Platygorgia**) [1]
Calyces prominent and bilabiate . . . . . (**Eunicea**)
Calyces moderately prominent, not bilabiate.
  Spicules armed with long, truncate verrucæ . . . . . (**Anthoplexaura**)
  Spicules small, the outer layer club-shaped. . . . . (**Paraplexaura**)
Calyces neither bilabiate nor decidedly prominent. Axis not distinctly flattened.
  Axis entirely horny, except at base, or with calcareous particles deposited in the central core.
  Spicules usually spindles, horizontally or longitudinally placed in outer layer of cœnenchyma.
  Cœnenchyma thick. No very large, bar-like spicules. . . . . **Plexaura**

[1] Generic names enclosed in brackets indicate that such genera are not represented in the Siboga collection.

Cœnenchyma thin. Large, bar-like spicules very prominent. . . . **Hicksonella**
Spicules of outer layer clubs or "Blattkeulen" vertically placed.
Clubs large. Terminal branches long and slender . . . . . **Plexauroides**
Clubs small. Terminal branches short . . . . . (**Paraplexaura**)
Clubs minute, their club-ends inflated and free . . . . . (**Eunicella**)
Axis with a central horny core, around which is a tubular casing containing more or less calcareous matter.
Spicules large, clubs, crosses and triradiate forms predominating. . . (**Plexaurella**)
Spicules small, short oval spindles and double spindles predominating. **Euplexaura**

The writer is unable to find any character in the definition of the genus *Psammogorgia* Verrill by which it can be differentiated from others of the family. He therefore gives the definition proposed by the original describer, which is as follows:

"*Psammogorgia* Verrill. Corallum dichotomous or subpinnate, with ronnd branches. Axis horn-like. Cœnenchyma moderately thick, the surface finely granulated with small rough spicula. Cells scattered, sometimes flat, more frequently raised in the form of rounded verrucæ. Polyps with rather large, elongated, slender warty spindles at the bases of the tentacles. Spicula of the cœnenchyma mostly short, thick, and very rough, warty spindles and rough, warty clubs of moderate size".

(VERRILL, Transactions Connecticut Academy of Science, Vol. 1, Part 2, p. 414).

Synoptic view of the genera and species of the Siboga collection of PLEXAURIDÆ.

*The asterisk (*) denotes a new genus or species.

Plexaura.

**Plexauroides.*

P. praelonga, *P. lenzii.*

**Euplexaura.*

**E. rubra*, **E. mollis*, **E. reticulata.*

Hicksonella.

**H. princeps.*

Psammogorgia.*

P. arbuscula.

The above table indicates that of the thirteen species of the Plexauridæ collected, ten appear to be new, and nearly half of the total number belong to the type genus, *Plexaura*. This genus has heretofore been unrepresented in the East Indian Region, with the exception of one species which THOMSON and HENDERSON identify as a variety, (*flexuosa*) of *P. antipathes*. The present writer is of the opinion that this form is identical with the new species *P. aggregata*, described beyond.

Systematic discussion of genera and species.

Plexaura Lamouroux (emended).

Plexaura Lamouroux. Histoire des Polypiers coralligènes flexibles, 1816, p. 424.
Plexaura Lamouroux. Exposition Méthodique, 1821, p. 35.
Plexaura Milne Edwards et Haime. Histoire Naturelle des Coralliaires, Vol. 1, 1857, p. 152.

Plexaura Duchassaing et Michelotti. Coralliaires des Antilles, 1860, p. 25.
Plexaura Kölliker. Icones Histologicæ, II, 1865, p. 138.
Plexaura Wright and Studer. Challenger Reports, the Alcyonaria, 1889, p. 137.
Plexaura Thomson and Henderson. Pearl Oyster Fisheries Reports, the Alcyonaria, 1905, p. 304.

The original describer, LAMOUROUX, gave a definition for this genus that needs little change to fit it for modern use. It is as follows:

"Polypier dendroïde, rameux, souvent dichotome; ramaux cylindriques et roides; axe légèrement comprimé; écorce, dans l'état de dessication, subéreuse, ou terreuse, très-épaisse, faisant peu d'effervescence avec les acides, et couverte de cellules éparses, grandes, nombreuses, souvent inégales et qui ne sont jamais saillantes".

Eliminating non essential points, the difinition used for the present work will be as follows:

Cœnenchyma thick, calyces included and distributed on all sides of the stem and branches. Spicules in the form of warty spindles and clubs, usually in two layers. Axis entirely horny, except at the base of the stem of large specimens.

The character of the axis will differentiate this genus from **Plexaurella**, which greatly resembles it superficially, and from **Euplexaura** and **Pseudoplexaura**. The characters of the spicules will separate it from **Plexauroides** and **Hicksonella**.

The type of this genus is *Plexaura heteropora* (Lamarck).

Owing to the superficial resemblance between **Plexaura** and **Plexaurella**, both genera abundant in species, it is impracticable, without recourse to the types, to tell which of the species originally described should be placed in **Plexaura**. Both of these genera are but sparsely represented in previous collections from the Western Pacific, or Indo-Pacific region. Hence it is not surprising that the species in the Siboga collection are all apparently new.

1. *Plexaura aggregata* new species. (Plate I, figs. 1, 1*a*; Plate IV, fig. 1).

Stat. 58. Anchorage off Seba, Savu Island. Up to 27 meters.
Stat. 65ª. 7° 0′ S., 120° 34′.5 E. Flores Sea. Depth changing rapidly from 400—120 meters. Coral bottom.
Stat. 213. Saleyer anchorage, and surroundings. Up to 36 meters.
Stat. 258. Tual anchorage, Kei Islands. Reef. 22 meters.
Stat. 315. Anchorage East of Sailus Besar, Paternoster Islands. Up to 36 meters.

Colony consisting of a dense clump of branches, 36 cm. in height. The branches all spring from the base of the colony and almost immediately begin to subdivide. The base is about 4.5 cm. broad, and the largest branches have a diameter of about 2 cm. The branches divide irregularly, but ordinarily the division is not dichotomous, until ultimate branchings of the 9th or 10th order are attained, the result being hundreds of terminal twigs with a diameter of about 3 mm. All of the branches are round and smooth, and distinctly enlarged at their ends. The calyces are inserted on all sides of the branches, and are evenly spaced, averaging about 1 mm. apart. The cœnenchyma is very thick.

The individual calyces are completely inserted, leaving the surface of the branch perfectly even, except where pitted by the calyx apertures. These pits are quite small, in alcoholic specimens, the pits being oval instead of round, their greater diameter being parallel to the

long axis of the branch and seldom attaining a length of over 1 mm. The margin appears to be divided into shallow lobes lying horizontally. The polyps are small, with delicate fringed tentacles, their bodies bearing eight longitudinal bands of very slender spindles. The tentacles appear to be unarmed.

A cross section of a branch shows a horny axis surrounded by very large watervascular canals symmetrically arranged on all sides of the axis, their cavities being larger than those of the calyces.

Spicules. These are all very small and the prevalent type is a very deeply tuberculate spindle with the tubercles arranged in definite series or zones. Clubs are also common. There are no well-defined layers of spicules in the cœnenchyma.

Color. The colony is very light brown, in alcohol. The axis is almost black proximally, and lightens distally. It has a slender, white core, which is not calcareous.

This species is probably identical with *Plexaura antipathes* var. *flexuosa* Thomson and Henderson. Ceylon Pearl Oyster Fisheries Report, the Alcyonaria, 1895, p. 305.

It seems a very distinct species, however, differing from *Plexaura antipathes* in having no violet spicules.

A specimen from Stat. 258 is much larger than the one described, being 90 cm. in height, with a main stem 2 cm. in diameter. At the base there is a solid, flinty, calcareous layer surrounding a horny core 7 mm. in diameter. The axis of the branches is entirely horny.

2. *Plexaura attenuata* new species. (Plate I, figs. 2, 2*a*; Plate IV, fig. 2).

Stat. 162. Between Loslos and Broken Islands, West coast of Salawatti. 18 meters.
Stat. 164. 1°42′.5 S., 130°47′.5 E. Near New Guinea. 32 meters.
Stat. 285. 8°39′.1 S., 127° 4′.4 E. Timor Sea. 34 meters.
"Bay of Batavia. Professor SLUITER leg.".

Specimen (incomplete) consisting of a straight, wand-like stem about 37 cm. long, from which project three short, straight branches all of which have their distal ends broken off. The greatest diameter of the main stem is 3 mm., tapering to 2 mm. near its distal end. The calyces are evenly distributed on all sides of the colony, but are larger and further apart than in *Plexaura aggregata*. Nearly all of the polyps are partly extended, and this gives the calyces the appearance of being partly exserted and verruciform. In fact, however, the calyces are hardly raised above the general level of the cœnenchyma when the polyps are retracted, although there may even then be a slight swelling.

The individual calyces are about 1.7 mm. in diameter, and when the polyp is retracted the calicular margin shows eight very plain scallops or lobes which are larger and deeper than in the preceding species. The polyps are able to protrude their bodies considerable above the calyces and still keep the tentacles folded within the body walls, where they form an acorn-shaped mass, the individual tentacles being plainly seen within the transparent body wall. The lower part of the polyp shows very delicate longitudinal bands of spicules.

A cross section of the stem shows a thick cœnenchyma in which the calyces are sunken almost to the axis cylinder. The canals are not nearly so regular and distinct as in *Plexaura aggregata*. The axis is horny, with a white noncalcareous centre.

Spicules. The spicules are all small, terete spindles with regularly disposed annular rows of compound verrucæ, giving a very symmetrical pattern. Definite layers of spicules can not be made out, as they seem to pack the cœnenchyma from the surface nearly to the axis. The spicules are those which KENT figures as characteristic of the genus *Verrucella* in the Monthly Microscopical Journal, Feb. 1st, 1870, Plate XLII, fig. 3.

Color. The specimen is a light brown or tan color. The axis is dark brown and the spicules are colorless.

3. *Plexaura recta* new species. (Plate II, figs. 3, 3*a*; Plate IV, fig. 3).

Stat. 273. Anchorage off Pulu Jedan, E. coast of Aru Islands (Pearl Banks). 13 meters.
Stat. 299. Buka or Cyrus Bay, South coast of Rotti Island. 34 meters.
*Pulu Missa near Flores. J. H. DE SISO don. 3 specimens.

Colony flabellate in form, not reticulate, attaining a height of 59 cm. About 2 cm. above the base the main stem divides into two, and each of these divides often, but not usually, in a dichotomous manner until twigs of the 7th order of division are attained. The ultimate branches are long and slender, erect and parallel. They sometimes attain a length of 39 cm., are round, and of approximately of the same diameter throughout. The main stem is 1 cm. in diameter at its base, and the ultimate branches are from 2 to 3.5 mm. in diameter. The calyces are evenly distributed on all sides and are entirely included when the polyps are retracted, leaving but a slightly elevated border around the apertures. The apertures, in dried specimens, form sharp oval openings.

The individual calyces are small and sunken almost to the axis. The margin is surrounded by well-marked scallops as in the preceding species. The tentacles in the specimen described often protrude through these apertures, although the polyps themselves are entirely retracted. The tentacles are very long, with long delicate fringes. I am unable to find any spicules in the body walls or tentacles.

A cross section of a branch reveals a condition much as in the last species. The axis is noncalcareous, with a white centre around which are a number of light-colored strands, none of which are calcareous. The canals are proportionally small and inconspicuous, and their arrangement can not easily be determined.

Spicules. These are very short, stout, small densely tuberculate spindles, often so short as to be almost globular. The tubercles are so closely crowded as to cover the whole surface almost like the round cells of a morula. There is no division of spicules into definite layers.

Color. The colony is dark brown, in alcohol. Axis black, lightening distally. A specimen from Stat. 273 is 64 cm. in height, and more profusely branched than the type described.

4. *Plexaura platystoma* new species. (Plate II, figs. 2, 2*a*; Plate IV, fig. 4).

Stat. 43. Anchorage off Pulu Sarassa, Postillon Islands. Up to 36 meters.

Colony of irregular and straggling habit, 16 cm. in height. The main stem gives off four branches of very unequal size, one of which arises about 5 cm. from the base. This becomes the main part of the colony, bearing several short stubby branches very unequally distributed, and one large descending branch producing a number of slender undivided branchlets in an indistinctly pinnate manner. The diameter of the main stem and largest branch is 1.8 mm. The calyces are entirely included and rather sparsely distributed on all sides of the stem and branches. The polyps in retraction draw the calyx margins together so that the apertures are almost obliterated. In the dried fragment of a branch, however, the apertures are really much larger than in either of the preceding species.

The individual calyces, although hardly evident externally, are really considerably broader than in the other species described. The apertures are oval, the long diameter being parallel with the axis. The longer diameter of the calyx is about 1.5 mm. The polyps have eight longitudinal bands of slender spindles, and the tentacles have a number of delicate spindles on their dorsal surface. These latter are arranged in two longitudinal series on each tentacle, so as to approach the en chevron arrangement on the proximal portions. The layers of the cœnenchyma are not well defined.

A cross section of a branch shows a moderately thick cœnenchyma, well-defined but not numerous watervascular canals, and a horny axis with a white, noncalcareous core.

Spicules. These are rather slender, usually curved spindles of the same general type as in *Plexaura attenuata*, but larger than any others thus far described in this report, some of them attaining a length of 1 mm. The annular arrangement of the tubercles is not so well-marked as in *P. attenuata*.

Color. Very pale gray, almost white, in alcohol. The axis is golden brown proximally and very pale distally.

5. *Plexaura pinnata* new species. (Plate I, figs. 3, 3*a*; Plate IV, fig. 5).

(The locality can not be given, as the label is missing).

Colony flabellate in form, 16 cm. in height and with a spread of 9 cm. The main stem has been broken just above the origin of the first main branch, which thus constitutes practically the entire specimen. This branch bears numerous branchlets in a pinnate manner, but they are neither opposite nor regularly alternate. The calyces are regularly distributed on all sides of the stem and branches, and are about 1 mm. apart.

The individual calyces are included, there being no external swelling except a slight tumidity about the margin, as in other species of this genus. The aperture is quite small, usually round, the tentacles being sunken below the eight-lobed fringe around the inner side of the margin. The polyp is much compressed, when retracted, a longitudinal section being an oval whose width is greater than the length. There are a few delicate spindles in the polyp body and tentacles.

A cross section of the stem shows a moderately thick cœnenchyma, a series of small but well-defined watervascular canals, and an axis with a proportionally large white central core.

Spicules. These are all small, but of several types. Regular, terete spindles with regularly disposed, very prominent verrucæ are common. There are also many double clubs such as KENT calls "laminatoclavate" spicules [1], with a marked constriction around the middle.

A number of crosses are also found, the arms of the crosses being tumid and densely tuberculate, forming a four-leaved rosette. While the cœnenchyma is divided into two layers by the watervascular system, I can not determine any constant difference between the spicules of these layers.

Color. The colony in alcohol is very light buffy brown. The axis is dark brown and the spicules colorless.

6. *Plexaura flava* new species. (Plate II, figs. 1, 1*a*; Plate IV, fig. 6).

Stat. 19. Bay of Labuan Tring, West coast of Lombok. 18—27 meters.
Stat. 60. Haingsisi, Samau Island, Timor. Reef. 23 meters.
Stat. 142. Anchorage off Laiwui, coast of Obi Major. 23 meters.
Stat. 273. Anchorage off Pulu Jedan, East coast of Aru Islands. 13 meters.

A number of fragments of apparently more than one specimen were collected at Station 19. The largest consists of a dense tuft of branches and branchlets, and is 37 cm. long. The main stem is 8 mm. in diameter, and abruptly angulated 2.2 cm. from its base. After giving off one compound, and a number of simple branches, it divides into two approximately equal parts 12.5 cm. from its base. These branches give off numerous compound and simple branchlets. On their proximal portions both the main branches and their compound offshoots give off terminal twigs from all sides. On their distal portions they give off usually simple twigs with a strong tendency to a regularly pinnate arrangement, although occasional twigs are given off from both the front and back of the distal parts of the colony. The pinnæ are about 4 mm. apart, on the average, and about 1.5 mm. in diameter. The main stem is flattened, but the branches are round. The calyces are rather more prominent than in most species of this genus, and are distributed on all sides of the branches, with a tendency to be more crowded on the sides than on the front and back.

The individual calyces show externally as very low verrucæ. The aperture is often completely closed by the contraction of the calyx margin. The polyps are completely retractile, but the tentacles do not sink below the level of the polyp walls. Thus there appears no lobular margin around the calycular mouth, but the tentacles, in retraction, lie immediately below the margin. The tentacles are very deeply fringed. There are a few very minute, bar-like spicules on the body walls and basal parts of the tentacles.

A cross section of a branch shows a rather ill defined series of watervascular canals, and an axis wholly corneous with a rather large central core which is white.

[1] KENT. On the Calcareous spiculæ of the Gorgonacea. Monthly Microscopical Journal, Feb. 1, 1870, p. 76, plate XLII, figs. 38, 43.

Spicules. The spicules are mainly spindles, straight and curved, relatively large as compared with most of the others in the Siboga collection of this genus, but not so as compared with some other Plexauridæ. A few club-shaped forms are present.

Color. The colony is a light naples yellow, probably brighter when fresh. The axis is brown and the spicules colorless.

This species differs in general appearance from the other species of *Plexaura* in the collection, but the writer is unable to find any structural difference, unless it be in the spicules, which do not seem of a sufficiently different type to warrant its exclusion from the genus.

Plexauroides Wright and Studer (emended).

Plexauroides Wright and Studer. Challenger Reports, the Alcyonaria, 1889, p. 138.
Plexauroides Studer. Alcyonarien aus der Sammlung des Naturhistorischen Museums in Lübeck, 1894, p. 111.
Plexauroides Brundin. Alcyonarien des zool. Museums in Upsala, 1896, p. 19.
Plexauroides Kükenthal. Japanische Gorgoniden, II. Teil, 1909, p. 27.

The original definition of this genus is as follows:

"Colony branching, mostly in the one plane. Stem and branches cylindrical. Axis horny dense, with the central portion calcareous. Nutrient canals symmetrically arranged. Cœnenchyma thin, consisting of two very distinct layers of spicules, the one nearest the axis is composed of irregular stellate forms, the outer layer of large Blattkeule, the broad foliar expansions of which project beyond the surface of the cœnenchyma forming a rough imbricated surface".

The polyps are numerous, fully retractile, with scarcely visible verrucæ, the edges of these latter being fringed with rows of the broad projecting folia of the Blattkeule.

KÜKENTHAL re-defines the genus so as to exclude *Plexauroides verrucosa* Brundin, and *P. asper* Moroff, which he places in a new genus *Paraplexaura*, which he differentiates from **Plexauroides** mainly on account of short terminal branches and true calyces.

Aside from the original definition, there is no reference to the calcareous core to the axis, and it is not referred to by BRUNDIN in his discussion of the genus. The specimens in the Siboga collection do not show this character, but there is a white core to the axis which is not calcareous. It may possible have deceived the describer of the genus, as it looks very much like a calcareous core.

The spicules are the characteristic feature of the genus, which may be described as follows:

Plexauridæ with a horny axis, long terminal branchlets inserted calyces, cœnenchyma rather thin, but composed of two very distinct layers of spicules. The outer layer is formed of spicules whose proximal part bears branched, warty radiating processes projecting downward and outward; and whose distal portions are composed of broad, leaf-like expansions standing at right angles to the surface of the branch when in situ. The inner layer of spicules is composed of smaller cruciform or stellate forms.

The type of this genus is *Plexauroides prælonga* (Ridley). The other known species are *Plexauroides indica* Ridley, *P. unilateralis* Studer, *P. lenzii* Studer, *P. michelsoni* Kükth., *P. rigida* Kükth., *P. simplex* Kükth. and *P. filiformis* Kükth.

This genus has much in common with the genus *Eunicella* Verrill, especially in the form of the spicules.

1. *Plexauroides prælonga* (Ridley).

Plexaura prælonga Ridley. Report on the Zoological Collections of H. M. S. Alert, 1884, p. 339.
Plexauroides prælonga Wright and Studer. Challenger Reports, the Alcyonaria, 1889, p. 138.
Plexaura prælonga, var. *elongata* Thomson and Henderson. Ceylon Pearl Oyster Fisheries Report, Alcyonaria, 1905, p. 305.

Stat. 273. Anchorage off Pulu Jedan, East coast of Aru Islands. (Pearl Banks). 13 meters.

Colony (dried) flabellate in form, 62 cm. in height and about 20 cm. in spread. The main stem gives off a large branch 9 cm. from its base, and this bears several lateral branches which are usually simple and attain a length of as much as 24 cm. The remainder of the colony consists of the continuation of the main stem and its branches. These latter are roughly alternate in position and tend to divide dichotomously until branches of the third order are produced. The terminal twigs are very long and slender. The diameter of the main stem is 9 mm., and of the branches about 3 mm. The calyces are entirely inserted, and are so completely immersed that only their openings are seen. They are evenly distributed on all sides of the branches, their mouths being about 1 mm. apart.

Nothing but the openings of the individual calyces are to be seen in the dried specimens. These are oval and less than 1 mm. in their longer diameter. The polyps could not be seen in the specimens at hand.

A cross section of a branch shows a very thick cœnenchyma with a superficial layer of "Blattkeulen" standing at right angles to the surface, and an inner layer of colorless cruciform or stellate spicules. The watervascular canals are large and conspicuous. The axis cylinder has a white, noncalcareous core.

Spicules. These are mainly typical "Blattkeulen" with a branched and densely tuberculate basal portion and a distal, disk-like comparatively smooth part. This latter portion is often inflated in appearance and approaches very closely the *Echinogorgia* type, as pointed out by Studer in his study of *Plexauroides lenzii*[1] besides these, which are by far the most numerous, there are cruciform and stellate spicules of much smaller size.

Color. The colony is bright crimson. The axis is black, fading distally to a light greenish brown. The spicules are bright red.

General distribution. The type was secured in Torres Strait. The Challenger found it off Cape York at a depth of 8 fathoms. It was secured also from the Pearl Banks of Ceylon.

This is a very beautiful and well marked species.

2. *Plexauroides lenzii* Studer.

Plexauroides lenzii Studer. Alcyonarien aus der Sammlung des Naturh. Museums in Lübeck, 1894, p. 114.

[1] Alcyonarien aus der Sammlung des Naturh. Museums in Lübeck, 1894, p. 114.

Stat. 258. Tual Anchorage, Kei Islands. 22 meters. Lithothamnion.
Stat. 273. Anchorage off Pulu Jedan. East coast of Aru Islands. (Pearl Bank). 13 meters.

Colony flabellate in form, 21 cm. in height and about 16 cm. in diameter. The main stem forks about 2.5 cm. from its base, and one of the resulting divisions again forks, making three main branches to the colony, which give off lateral branches in a very irregular manner, often redividing until branchings of the 5th and 6th orders are attained. The diameter of the main stem is 6 mm., of the main branches 5 mm. and of the slender, straight ultimate branches 2 mm. The calyces are evenly distributed on all sides of the stem and branches, their mouths being ordinarily about 1 mm. apart from centre to centre.

The individual calyces are included, there being nothing visible externally except a very slight swelling around the margins, this swelling fading insensibly into the general surface of the cœnenchyma. The calyx walls are covered with the imbricating scales or foliar expansions of Blattkeulen that form the distal portions of the superficial layer of spicules. The polyps are completely retractile, the calycine apertures being in most cases obliterated. The retracted polyps are very much flattened, being really reduced to disk-shaped bodies. There are a few slender spicules on the upper surfaces of the tentacles, there usually being two longitudinally disposed on each tentacle.

A cross section of a branch shows the two layers of spicules characteristic of the genus, the outer with the scarlet foliar expansions standing erect, as if radiating from the axis. The inner layer is composed of colorless spicules which are small and of various forms. The water-vascular canals are not well differentiated, and the axis is horny, sometimes with a hollow centre.

Spicules. The Blattkeulen are like those of the *Echinogorgia* type found in the Muriceidæ, but the smooth, distal foliar expansions are aggregated into a knob-like head. Sometimes this is much flattened so as to become disk-shaped. The proximal, immersed parts of these spicules bear dense masses of tuberculated or branched processes reaching downward and outward. Besides these there are a number of tuberculate spindles, crosses, butterflies, clubs, etc. which are found in the inner layer of the cœnenchyma.

Color. The colony is bright scarlet, as are the Blattkeulen.

The specimens collected by the Siboga Expedition do not show the calcareous core to the axis cylinder described by STUDER. They agree, however, so well in all other particulars that the writer feels confident of the correctness of his identification.

Euplexaura Verrill (emended).

Euplexaura Verrill. Proceedings of the Essex Institute, VI, 1869, p. 143.
Euplexaura Wright and Studer. Challenger Reports, the Alcyonaria, 1889, p. 143.
Euplexaura Brundin. Alcyonarien des Zool. Museums in Upsala, 1896, p. 20.
Euplexaura Kükenthal. Japanische Gorgoniden, II. Teil, 1909, p. 6.

The orginal description of the genus is as follows:

"In external characters it resembles *Plexaurella*, with rather large, open cells. The spicula are mostly stout, blunt, warty spindles, and rarely small, irregular crosses".

WRIGHT and STUDER add to this description the character of the axis, which is really the best diagnostic feature of the genus. After quoting VERRILL's definition they add:

"To this may be added that in the structure of the axis there is a general resemblance to that of *Plexaurella*".

In spite of this "general resemblance", however, there is a very distinct difference between the axis of *Plexaurella* and that of *Euplexaura*. In a cross section of a branch of a typical species of *Plexaurella* the clear, horny core is surrounded by a thick envelope which is composed of a number of long, vermiform, white calcareous bodies enclosed in a casing of chitin. In a similar section of *Euplexaura* no such definite structure of the axis is seen; but there is a central core of pure, translucent, horny material around which is a thick cylinder of horny material extensively impregnated with lime salts. These latter sometimes seem to take the form of fibres, but are not nearly so distinct and white as the vermiform bodies of *Plexaurella*. The axis of the latter genus is excellently well illustrated by KÖLLIKER, Icones Histologicæ, II, plate XIV, fig. 8. It has also been described and figured by the present writer[1].

KÜKENTHAL has emended the definition of this genus in so satisfactory a manner that we may adopt his diagnosis, which is as follows:

"Kolonien in einer Ebene verzweigt. Polypen fast stets ohne gesonderte Kelche direkt in das dicke Cœnenchym zurückziehbar. Polypen stets mit konvergierenden Reihen von Spindeln bewehrt, unter denen horizontal angeordnete liegen. Die Rinde enthält an der Oberfläche dicke, meist ovale Spindeln und Doppelspindeln, die dicht mit grossen Warzen besetzt sind, darunter liegen kleinere, schlankere Spindeln mit regelmässigen Dornengürteln. Achse fast stets etwas verkalkt und wenig biegsam. Die Färbung sämtlicher Arten schwankt zwischen weiss, gelblich und hellbraun".

The type of the genus *Euplexaura* is *Euplexaura capensis* Verrill. The other known species are *Euplexaura pinnata* Wright and Studer, *E. rhipidalis* Studer, *E. parciclados* Wright and Studer, *E. anastomosans* Brundin, *E. curvata* Kükth., *E. robusta* Kükth., *E. crassa* Kükth., *E. abietina* Kükth., *E. sparsiflora* Kükth., *E. erecta* Kükth., *E. albida* Kükth., *E. braueri* Kükth., *E. parva* Kükth., and the new species about to be described.

1. *Euplexaura rubra* new species. (Plate III, figs. 3, 3*a*; Plate IV, fig. 7).

Stat. 164. 1°42'.5 S., 130°47'.5 E. Near New Guinea. 32 meters.

Colony incomplete, about 8 cm. long. The basal part is lacking, and it appears that we have but the terminal portion of the main stem, or large branch, giving off two small lateral branches on one side, and one on the other. The stem and branches are round in section, the diameter of the former being 2.5 mm. and of the branches about 1.5 mm. The calyces are rather prominent for this family, and are equally distributed on all sides of the branches.

The individual calyces are coninal in form, a typical one measuring about 1 mm. in height and 1.4 mm. across the base. The polyps are completely retractile, the summits of the

[1] NUTTING, Anatomy of the Gorgonidæ, Bulletin from the Laboratories of Natural History of the State University of Iowa, Vol. I, N° 2, 1889, p. 129, plate II, figs. 8, 9 and 10.

calyces closing over them, but showing an eight-rayed margin. The polyps are very small, and it is difficult to make out their characters of spiculation on account of the intimate cohesion of the polyp and calyx walls. It seems, however, that there are a few spindles longitudinally arranged on the walls and tentacles.

A cross section of a branch shows the ordinary features of this family, except the structure of the axis cylinder. This has a very decided intercalation of lime salts, the axis appearing to be composed of fibres between which are deposited the calcareous particles in such quantities that the axis boils violently when immersed in dilute acid. The watervascular canals seem fewer and more widely separated than is common in the Plexauridæ.

Spicules. These are all densely tuberculated spindles which are so short as to become oval in outline, and to resemble the disk-like forms of some species of *Placogorgia*. There is little variation, except in size, probably due to age.

Color. The colony is scarlet throughout, except the polyps, which still show a yellowish color in alcohol and were probably bright yellow in life.

2. *Euplexaura mollis* new species. (Plate III, figs. 4, 4*a*; Plate IV, fig. 8).

Stat. 299. 10° 52′.4 S., 123° 1′.1 E. Cyrus Bay, Rotti Island. 34 meters.

Colony incomplete, flabellate and reticulate. The proximal part is missing, the specimen being 27 cm. in height and 15 cm. broad. The main stem, or branch, forks about 3 cm. from its proximal end, and behind this forking a thick stump of a branch is directed backward and a little downward. One branch of the fork is cut off 6.5 cm. from its base and is connected by heavy anastomoses with the other branch. This latter forms the main part of the colony, a central stem proceeding nearly to the periphery where it is dissipated in the reticulation. The ultimate twigs are slender and but little over 1 mm. in diameter. The calyces are distributed on all sides of the branches, their openings being about 1 mm. apart.

The individual calyces are almost entirely included in the cœnenchyma, and show externally as low, dome-shaped verrucæ with small round apertures, in the dried specimen. The polyps are small and retracted so that their infolded tentacles are almost on a level with the calyx margin in alcoholic specimen. The margin is lined with an eight-lobed membrane caused by the infolding of the œsophageal region of the polyp. The infolded tentacles are provided with a pseudo-operculum much like that of the Muriceidæ.

A cross section of a branch shows a moderately thick cœnenchyma with two layers of spicules imperfectly divided by the series of watervascular canals, but not showing two distinct kinds of spicules. The axis cylinder is full of intercalated particles of lime salts, as in the last species, and effervesces violently in weak acid solution.

Spicules. The spicules of this species are all small, even minute, in comparison with others of the family. The most common form is a small terete spindle with relatively large tubercles arranged in definite whorls. There are also minute globular forms, crosses and dumb-bells.

The small size of the spicules renders the surface much smoother than is usual, and the cœnenchyma is sponge-like in texture.

Color. The colony is dull, rather light, brown, or dust color.

3. *Euplexaura reticulata* new species. (Plate III, figs. 2, 2*a*; Plate IV, fig. 9).

Stat. 38. 7° 35.4 S., 117° 28'.6 E. Near Paternoster Islands. 521 meters. Coral.
Stat. 117. 1° 0.5 N., 122° 56' E. Kwandang Bay, North Celebes. 80 meters. Sand and coral.
Stat. 144. Anchorage north of Salomakiëe (Damar) Island. 45 meters. Coral bottom and Lithothamnion.

The type of this species is a mere fragment, but is plainly different from others of this genus in the collection. Colony flabellate and reticulate, the part preserved being evidently from near the margin of the colony and showing the anastomoses of the branches. The fragment is 3.2 cm. long, and consists of a main branch which gives off two branchlets from one side. The lower of these gives origin to three short stubs of branches from its outer side and sends forth another on the opposite side, which anastomoses with the main stem. The greatest diameter of the stem, near the base is 2 mm., and the least diameter of twigs is 1.2 mm. The calyces seem to be more unevenly distributed than in other species, being almost contiguous in some places and as much as 2 mm. apart in others.

The individual calyces, while not much exserted, have sharply cut margins and are therefore more pronounced than in other species of the genus in the collection. When open they have the form of low truncated cones, and when closed they appear as low domes. When the polyp is fully retracted a series of eight points are seen directed towards the centre. These points constitute a pseudo-operculum on the dorsal side of the retracted tentacles. Each opercular flap consists of several spindles arranged en chevron on the proximal part of tentacle, and a number of longitudinal spindles on the distal part. There is also a well marked collaret.

A section of a branch shows the same features as have been described in the preceding species. The axis contains a number of calcareous fibres that can be separated by boiling in potash.

Spicules. The spicules are mainly small, but hardly minute, terete spindles which are densely tuberculate, the tubercles seldom appearing to be in definite whorls. The spindles are quite uniform in character.

Color. The fragment is light grayish brown.

Two specimens of this species were found in the collection after the above description was written. They are much larger than the type, but neither is complete. One of them is 12 cm. in length, and both are plainly reticulate.

Hicksonella new genus.

Plexauridæ with a thick cœnenchyma, calyces included and on all sides of the branches, horny axis cylinder, and two very different types of spicules. One type consists of very small, short, warty spindles, and the other of comparatively large, slender, bar-like, smooth spindles sometimes attaining a length of 1.2 mm.

The type species of this genus is *Hicksonella princeps* Nutting.

Just as the two types of spicules furnish the generic distinction that is most prominent in the genus *Plexauroides*, so two very different forms of spicules are here used as the diagnostic features of the genus *Hicksonella*, which the author takes pleasure in naming after the accomplished naturalist Professor Sydney J. Hickson who has done such important work in the Alcyonaria.

1. *Hicksonella princeps* new species. (Plate III, figs. 1, 1*a*; Plate IV, fig. 10).

Stat. 240. Banda Anchorage. 9—45 meters. Sand and coral.
Stat. 315. Anchorage East of Sailus Besar, Paternoster Islands. Up to 36 meters. Coral and Lithothamnion.

Colony densely arborescent, forming a profusely branched clump 17 cm. in height and 15 cm. in diameter. Immediately above the base the colony divides into two large trunks, each of which divides in an irregular manner until branches of the seventh order are sometimes attained. The larger branches tend to divide by sending off branchlets in the same plane, thus forming a palmate structure of the main branch. Many of the secondary branches send off a number of closely approximated branchlets from one side. The distal portions of the colony consists of very numerous twigs in dense tufts, the ultimate branches being very short. The diameter of the colony at base is 1.3 cm., of the main branches .5 cm. and of the ultimate twigs 3 mm. Some of the larger branches are somewhat flattened, but the others are round. The calyces are thickly implanted on all sides of the stem and branches. In alcoholic specimens they are in the form of very low verrucæ, which are much less pronounced in dried specimens.

The individual calyces are included, small, round, with their margins but slightly elevated above the level of the cœnenchyma. The openings are usually quite round, but are sometimes oval. The polyp in retraction sinks far below the surface. Inside the calyx margin is a proportionately small border with eight undulations surrounding a central aperture below which the retracted tentacles lie.

A cross section of a branch shows a thick cœnenchyma, large and regularly arranged watervascular canals, and a horny axis cylinder with an exceptionally small central core of white noncalcareous substance. No definite layers of spicules can be made out, although there seems to be a distinct pellicle of cœnenchyma between the watervascular canals and the axis.

Spicules. These are of two very distinct kinds. By far the more numerous are quite small, short, densely tuberculated spindles, so short as to be oval in outline and entirely covered with verrucæ. The second type is comparatively large slender, almost smooth, bar-like or terete spicules attaining a length of 1.3 mm. Often one half is quite smooth and glassy, while the other is finely tuberculate, the tubercles being very small. I am unable to find any definite anatomical relations of these large spicules. In some cases their blunt smooth points were seen projecting outward from the calyx walls. They are sparsely and irregularly distributed.

Color. The colony is light buffy brown. The spicules are colorless.

A specimen of this species labeled from Station 315 is 95 cm. in length. In the one from Station 240 the large spicules are sometimes arcuate, but otherwise resemble those described above.

Psammogorgia Verrill.

Psammogorgia Verrill. American Journal of Science and Arts, XLV, 1868, p. 413.
Psammogorgia Verrill. Transactions Connecticut Academy of Sciences, Vol. I, Part 2, 1867—71, p. 414.
Psammogorgia Wright and Studer. Challenger Reports, the Alcyonaria, 1889, p. LIX.
Psammogorgia Nutting. Alcyonaria of the Californian Coast. Proceedings of the U.S. National Museum, Vol. XXXV, 1909, p. 719.

The original description of this genus by VERRILL is as follows:

"Corallum dichotomous or subpinnate, with round branches. Axis horn-like. Cœnenchyma moderately thick, the surface finely granulated with small rough spicula. Cells scattered, sometimes flat, more frequently raised in the form of rounded verrucæ. Polyps with rather large elongated, slender, warty spindles at the bases of the tentacles. Spicules of the cœnenchyma mostly short, thick and very rough, warty spindles and rough, warty clubs of moderate size".

As the author has remarked on another occasion (loc. cit.) this genus does not conform very well to the accepted characters of the family Plexauridæ, particularly in the absence of regularity in the disposition of the watervascular canals.

The species grouped together by professor VERRILL under the name *Psammogorgia* seem to be nearer this family, however, than any other thus far described, and the present writer prefers to follow VERRILL in regarding it as an aberrant genus of Plexauridæ rather than to raise it to family rank.

The type of the genus is *Psammogorgia arbuscula* Verrill. The other known species are *Psammogorgia fusca* Verrill, *P. fucosa* Verrill, *P. gracilis* Verrill, *P. simplex* Nutting, *P. spauldingi* Nutting, *P. teres* Verrill and *P. torreyi* Nutting.

1. *Psammogorgia arbuscula* Verrill.

Echinogorgia arbuscula Verrill. Proceedings Boston Society of Natural History, Vol. X, 1866, p. 329.
Psammogorgia arbuscula Verrill. American Journal of Science and Arts, XIV, 1868, p. 413.
Psammogorgia arbuscula Verrill. Transactions Connecticut Academy of Arts and Sciences, Vol. I, Part 2, 1867—71, p. 414.
Psammogorgia arbuscula Nutting. Alcyonaria of the Californian Coast, 1909, p. 719.

Stat. 262. 5° 53′.8 S., 132° 48′.8 E. Between Kei Islands. 560 meters. Mud.

Colony subflabellate in form, attaining a height of 22 cm. About 3 cm. from its base the main stem divides into three branches, two of which are subequal and form the main part of the colony. The third is smaller and bears two short, distant branches on the same side. The other two are joined by the anastomoses of two branchlets, one from each. One of them gives off two other branches from one side, and the other but one. The terminal branches are all long and slender, in one case attaining a length of about 19 cm. They are of about the same diameter (3 mm.) throughout. The calyces are unevenly distributed on all sides of the branches, although there are long bare species on the back of some of the branches. Otherwise they average about 2.5 mm. apart.

The individual calyces are very low verrucæ, scarcely elevated above the general level of the cœnenchyma and about 2 mm. in diameter. The verrucæ are surmounted by an eight-lobed margin. Their walls are filled with spindles which appear to be closely packed without definite arrangement. The polyps are completely retractile, but are often seen, in alcoholic specimens, with the tentacles resting above the margin and forming an acorn-shaped mass.

The body walls have eight longitudinal rib-like bands of parallel spindles which continue over the dorsal surface of the tentacles.

The cœnenchyma is thick, and a cross section of a branch shows that the watervascular canals are not regular in arrangement. The axis is entirely horny.

Spicules. Slender acute spindles predominate, often with a narrow but well defined bare zone in the centre. A few clubs are seen, also short, bar-like forms quite distinct from the numerous slender spindles.

Color. The colony is bright coral red, as are the spicules.

General distribution. Panama, and the Pacific Coast of Nicaragua, (VERRILL). The Californian Coast, (NUTTING).

DISTRIBUTION OF THE PLEXAURIDÆ COLLECTED BY THE SIBOGA EXPEDITION.

List of Stations

at which Plexauridæ were collected by the Siboga Expedition, and a List of Species collected at each Station.

STATION 19. 8°44'.5 S., 116°2'.5 E. West Coast of Lombok. 18—27 meters. River mud, coral, coral sand. *Plexaura flava.*

STATION 38. 7°35'.4 S., 117°28'.6 E. Near Paternoster Islands. 521 meters. Coral. *Euplexaura reticulata.*

STATION 43. Anchorage off Pulu Sarassa, Postillion Islands. Up to 36 meters. Coral. *Plexaura platystoma.*

STATION 58. Anchorage off Seba, Savu. Up to 27 meters. Sand. *Plexaura aggregata.*

STATION 60. Haingsisi, Samau Island, near Timor. 23 meters. Lithothamnion in 3 meters and less. Reef. *Plexaura flava.*

STATION 65a. 7°0' S., 120°34'.5 E. Depth changing rapidly from 400—120 meters. Coral bottom. *Plexaura aggregata.*

STATION 117. 1°0'.5 N., 122°56' E. Kwandang Bay entrance, North Celebes. 80 meters. Sand and coral. *Euplexaura reticulata.*

STATION 142. Anchorage off Laiwui, coast of Obi Major. 23 meters. Mud. *Plexaura flava.*

STATION 144. Anchorage North of Salomakië (Damar) Island. 45 meters. Coral bottom and Lithothamnion. *Euplexaura reticulata.*

STATION 162. Between Loslos and Broken Islands, West Coast of Salawatti. 18 meters. Coarse and fine sand, with clay and shells. *Plexaura attenuata.*

STATION 164. 1°42'.5 S., 130°47'.5 E. Near New Guinea. 32 meters. Sand, small stones and shells. *Plexaura attenuata, Euplexaura rubra.*

STATION 213. Saleyer Anchorage and surroundings. Up to 36 meters. Mud with sand. *Plexaura aggregata.*

STATION 240. Banda Anchorage. 9—45 meters. Black sand, coral, Lithothamnion bank in 18—36 meters. *Hicksonella princeps.*

STATION 258. Tual Anchorage, Kei Islands. 22 meters. Lithothamnion, sand and coral. *Plexaura aggregata, Plexauroides lenzii.*

STATION 262. 5°53'.8 S., 132°48'.8 E. Arafura Sea. 560 meters. Solid bluish gray mud. Upper layer more liquid and brown mud. *Psammogorgia arbuscula.*

STATION 273. Anchorage off Pulu Jedan, East coast of Aru Islands, (Pearl Banks). 13 meters. Sand and shells. *Plexaura flava, P. recta, Plexauroides prælonga, P. lenzii.*

STATION 285. 8° 39′.1 S., 127° 4′.4 E. Timor Sea. 34 meters. On the limit between mud and coral. Lithothamnion. *Plexaura attenuata, Euplexaura rubra.*

STATION 299. 10° 52′.4 S., 123° 1′.1 E. Cyrus Bay, Rotti Island. 34 meters. Mud, coral and Lithothamnion. *Plexaura recta, Euplexaura mollis.*

STATION 315. Anchorage East of Sailus Besar, Paternoster Islands. Up to 36 meters. Coral and Lithothamnion. *Plexaura aggregata, Hicksonella princeps.*

Specimens of *Plexaura recta* from Pulu Missa near Flores. J. H. DE SISO don.

Plexaura pinnata. Locality unknown, as the label is missing.

The list shows that Plexauridæ were collected at 19 of the stations occupied by the Siboga Expedition. As there appear to be somewhat more than 200 successful hauls from the bottom it follows that members of this family were secured by about 10% of these hauls, showing that the family is meagerly represented in this region in comparison with the Muriceidæ. No station yielded more than four species, while one Station (310) yielded no less than 17 species of the Muriceidæ.

But two species of Plexauridæ were secured at depths of over 500 meters. One of these was *Euplexaura reticulata*, from a depth of 521 meters; another was *Psammogorgia arbuscula*, from a depth of 560 meters.

The family thus appears to be largely restricted to moderately shallow water, which may in part account for the wide difference between the Atlantic and Pacific plexaurid faunæ.

The genus *Plexauroides* is the only one in which species previously recorded are found. *Plexauroides prælonga* has been reported from Australian waters and Ceylon, and *P. lenzii* is known to occur near Singapore. Neither of these localities is far from the East Indian region.

So far as the Siboga material bears testimony concerning the distribution of the Plexauridæ, that testimony is negative regarding the occurrence of species in both the Atlantic and Pacific. It is also a notable fact that the genera *Eunicea* and *Plexaurella*, both furnishing numerous species from the West Indies, are not at all represented in the Siboga collections.

As indicated above, the restricted bathymetric range of most of the known species of this family may account for the correspondingly restricted geographic range. Caution must be exercised, however, in drawing general conclusions from the limited information at our disposal.

Literature cited

in the Report on the Plexauridæ of the Siboga collection.

BRUNDIN, J. A. Z. Alcyonarien aus der Sammlung des Zoologischen Museums in Upsala. Bihang til k. Svenska Vet.-Akad. Handlingar, Band 22, Heft IV, N^0 3. Stockholm, 1896.

DUCHASSAING et MICHELOTTI. Mémoire sur les Coralliaires des Antilles, Turin, 1860.

GRAY, J. E. On the Arrangement of Zoophytes with Pinnated Tentacles. Annals and Magazine of Natural History, 3th. Series, Vol. 5, London, 1859.

KÖLLIKER, A. Icones histiologicæ, oder Atlas der vergleichenden Gewebelehre; 2te Abtheilung, der feinere Bau der höheren Thiere; 1stes Heft, die Bindesubstanz der Cœlenteraten, Leipzig, 1865.

KÜKENTHAL, W. Japanische Gorgoniden, II. Teil; Die Familien der Plexauriden, Chrysogorgiiden und Melitodiden. München, 1909.

LAMOUROUX, J. F. V. Histoire des Polypiers coralligènes flexibles, Paris, 1816.

—— Exposition Méthodique des Genres de l'ordre des Polypiers, Paris, 1821.

MILNE EDWARDS et HAIME. Histoire naturelle des Coralliaires, Vol. I, 1857.

NUTTING, C. C. Alcyonaria of the Californian Coast. Proceedings of the U. S. National Museum, Vol. XXXV, Washington, 1909.

RIDLEY, S. O. The Coral Fauna of Ceylon, with Descriptions of New Species. Annals and Magazine of Natural History, 5th. Series, Vol. 11, London, 1883.

—— Report on the Zoological Collections of H. M. S. "Alert", London, 1884.

STUDER, TH. Alcyonarien aus der Sammlung des Naturhistorischen Museums in Lübeck. Separatabdruck aus den Mitteilungen der Geographischen Gesellschaft und des Naturhistorischen Museums in Lübeck, II. Ser., Heft 7 und 8, Lübeck, 1894.

VERRILL, A. E. Review of the Corals and Polyps of the West Coast of America. Transactions of the Connecticut Academy of Arts and Sciences, Vol. I, Part 2, New Haven, 1867—71.

—— Proceedings of the Essex Institute, VI, 1869.

—— Critical remarks on the Alcyonoid Polyps in the Museum of Yale College, with descriptions of the New Genera. The American Journal of Science and Arts, Vol. XLV, New Haven, 1868.

WRIGHT, E. P. and STUDER, TH. Report on the Alcyonaria collected by H. M. S. Challenger during the years 1873—76. The Voyage of H. M. S. Challenger, Zoology, Vol. XXXI, 1889.

EXPLANATION OF PLATES

The photographs were made from nature by the author.
The spicules were drawn under the camera lucida by Mr. DAYTON STONER.

PLATE I.

Fig. 1. *Plexaura aggregata* n. sp. Natural size. 1 *a*, part of branch × 5.
Fig. 2. *Plexaura attenuata* n. sp. Natural size. 2 *a*, part of branch × 5.
Fig. 3. *Plexaura pinnata* n. sp. Natural size. 3 *a*, part of branch × 5.

PLATE II.

Fig. 1. *Plexaura flava* n. sp. Natural size. 1*a*, part of branch × 5.
Fig. 2. *Plexaura platystoma* n. sp. Natural size. 2*a*, part of branch × 5.
Fig. 3. *Plexaura recta* n. sp. Natural size. 3*a*, part of branch × 5.

PLATE III.

Fig. 1. *Hicksonella princeps* n. sp. Natural size. 1*a*, part of branch × 5.
Fig. 2. *Euplexaura reticulata* n. sp. Natural size. 2*a*, part of branch × 5.
Fig. 3. *Euplexaura rubra* n. sp. Natural size. 3*a*, part of branch × 5.
Fig. 4. *Euplexaura mollis* n. sp. Natural size. 4*a*, part of branch × 5.

1
1a
2
2a
3
3a
4
4a

PLATE IV.

Fig. 1. *Plexaura aggregata* n. sp. Group of 5 spicules, *a*, *b*, *c*, *d*, *e*. × 112.
Fig. 2. *Plexaura attenuata* n. sp. Group of 3 spicules, *a*, *b* and *c*. × 112.
Fig. 3. *Plexaura recta* n. sp. Group of 3 spicules, *a*, *b* and *c*. × 112.
Fig. 4. *Plexaura platystoma* n. sp. Group of 3 spicules, *a*, *b* and *c*. × 112.
Fig. 5. *Plexaura pinnata* n. sp. Group of 4 spicules, *a*, *b*, *c*, *d*. × 112.
Fig. 6. *Plexaura flava* n. sp. Group of 4 spicules, *a*, *b*, *c*, *d*. × 112.
Fig. 7. *Euplexaura rubra* n. sp. Group of 3 spicules, *a*, *b* and *c*. × 112.
Fig. 8. *Euplexaura mollis* n. sp. Group of 4 spicules, *a*, *b*, *c* and *d*. × 112.
Fig. 9. *Euplexaura reticulata* n. sp. Group of 4 spicules, *a*, *b*, *c*, *d*. × 112.
Fig. 10. *Hicksonella princeps* n. sp. Group of 6 spicules, *a*, *b*, *c*, *d*, *e* and *g*. × 112.
a and *b* represent one of the two general types, and the rest the other, or tuberculate type.

a
b
c
d
e
1
a
b
c
3
a
b
c
2
a
b
c
d
5
a
b
c
d
6
a
b
c
d
8
a
b
c
d
9
a
b
c
d
10
a
b
c
d
e
g
4
a
b
c
7
a
b
c